Basic Applications of Computers

What is a computer?

The term computer was taken from the Greek word compute means calculation and the computer was a person or device that did computation. A computer is a machine used to manipulate data or information and perform mathematical and logical operations. Modern computers perform a wide range of tasks, store retrieve, and process information. Using a computer we can create/modify documents, send/receive emails, browse information on the internet, and play video games. After the invention of computer science and technology became too advanced. Today we can not imagine growing our technology without computers.

Components of the computer system:

The various components of the computer system are classified into two groups.

- Hardware
- Software

1. **Hardware:** Hardware is the physical tangible component of the computer system. This type of component is touchable. CPU, Mouse, Keyboard are examples of hardware components. So, the hardware of the computer system are:

- **Input Device:** Input devices allow the user to enter data/information in the CPU (Central Processing Unit). Mouse, Keyboard, scanner, barcode reader are general examples of input devices.

- **Output Device:** Output devices input the processed data/information into human-readable form. Monitor, speaker, projector, printer are general examples of output devices .
- **Central Processing Unit (CPU):** The CPU is referred to as the brain of a computer system. It is used to processed data/information and provides output to output devices. The CU (control unit), ALU (arithmetic and logical unit), and registers are components of the CPU.

- **Storage:** In a computer, storage devices are used to store the data or information that entered into the computer system and the output comes from processing the information or data.

2. Software: Software is a collection of programs (set of instructions), data, and protocols. It is not in material form so we can not touch such types of components. The execution of software programs is performed by hardware. Firmware, operating systems, applications are examples of software.

Features of Computer

Speed: A computer is a time-saving device. It performs several calculations and tasks in few seconds that we take hours to solve. The speed of a computer is measure in terms of GigaHertz and MegaHertz.

Accuracy: A calculation or task performed by a computer is accurate the chances of occurring errors are minimal. The errors occur in a computer by entering wrong data by a human being. A computer performs several tasks and calculations so quickly and accurately.

Memory: A computer can store billions of records as per requirement and these records can easily accessible with full accuracy. The storing capacity of computer memory is measured in terms of Bytes, Kilobytes (KB), Megabytes (MB), Gigabyte(GB), and Terabyte(TB).

Versatility: A computer can perform more than one task at the same time, this feature is called versatility. For example, we can create our project using PowerPoint and Wordpad while listening to music or we can design a website while listening to music.

Automation: Today the world is moving toward AI (Artificial Intelligence) based technology. Once instructions are programmed, a computer can perform work automatically. This feature of the computer replaces thousands of workers by performing tasks automatically.
Reliability: A computer is a reliable device. The output results never differ until the input is different. If an input is the same then output won't be different.
Diligence: A human can not work for several hours without taking a rest whereas a computer device never gets tired. A computer can perform millions of calculations constantly with full accuracy without taking a rest.

Uses of Computer

Computers are used in every field of life, such as homes, businesses, educational institutions, research organizations, the medical field, government offices, entertainment, etc. Today we can not imagine growing our technology without computers. The various field where the computer is very essential are:

Role of Computer in Science: Today computer is the primary work tool in the field of science. It is the best-suited machine for collecting, analyzing, classifying, and storing data. It becomes the most essential medium to spread knowledge internally and internationally. It allows scientists from different locations to work together and share ideas on the same project.

Role of Computer in Defense System: A computer performs a vital to control defense system. Computers are used to track airplanes, missiles, tanks, and different kinds of weapons. Once the radar system tracks a missile and artificial intelligence is programmed to target a missile and destroy it before it comes on the surface. It also used for GPS tracking, controlling defense vehicles, records of all members of the military.

Role of Computer in Medical: The computer plays a very important role in medical science such as record patients' information monitoring heart rate, oxygen level, and blood pressure. To conduct various surgeries junior doctors get the help of another professional doctor by web conferencing. Research is also spread with the help of computers in the health sector.

Role of Computer in Education: Today learning becomes easy because of computers. Anyone employed or student can learn any stage of life with the help of a computer. Computers are very crucial for online classes, download study material on the internet. Computers are also used to track student attendance and learning strategies. Coaching and institutes increased their areas by audio-visual aids using computers

Role of Computer in Banking: A computer performs a crucial role in banking sectors, by storing several account holder details on a bank server. All transactions such as deposits and withdrawals perform by a computer. A banking company can easily monitor all ATMs and passbook printing machines.

Role of Computer in Government Sectors: Government can easily monitor government sectors such as road services , railway, development, and other rising funds. The information of every citizen is stored on the server through the computer.

Role of Computer in Entertainment: Today most people are so busy and they do not easily get time to fresh their mind. We can play various interesting video games using a computer. We can watch movies, TV shows, and reality shows on the computer. A computer is also used to create sarcastic memes and make us happy.

Types of Computers

A computer is a device that transforms data into meaningful information. It processes the input according to the set of instructions provided to it by the user and gives the desired output. Computers are of various types and they can be categorized in two ways on the basis of size and on the basis of data handling capabilities. So, on the basis of size, there are five types of computers:

- Supercomputer
- Mainframe computer
- Minicomputer
- Workstation
- PC (Personal Computer)

And on the basis of data handling capabilities, there are three types of computer:

- Analogue Computer
- Digital Computer
- Hybrid Computer

Generations of Computers

The modern computer took its shape with the arrival of your time. It had been around 16th century when the evolution of the computer started. The initial computer faced many changes, obviously for the betterment. It continuously improved itself in terms of speed, accuracy, size, and price to urge the form of the fashionable day computer. This long period is often conveniently divided into the subsequent phases
called computer generations:

First Generation Computers (1940-1956)
Second Generation Computers (1956-1963)
Third Generation Computers (1964-1971)
Fourth Generation Computers (1971-Present)
Fifth Generation Computers (Present and Beyond)

Before there are graphing calculators, spreadsheets, and computer algebra systems, mathematicians and inventors searched for solutions to ease the burden of calculation.
Below are the 8 mechanical calculators before modern computers were invented.

1. Abacus (ca. 2700 BC)
2. Pascal's Calculator (1652)
3. Stepped Reckoner (1694)
4. Arithmometer (1820)
5. Comptometer (1887) and Comptograph (1889)

First Generation Computers: Vacuum Tubes (1940-1956)

The technology behind the primary generation computers was a fragile glass device, which was called vacuum tubes. These computers were very heavy and really large in size. These weren't very reliable and programming on them was a really tedious task as they used high-level programming language and used no OS. First-generation computers were used for calculation, storage, and control purpose. They were too bulky and large that they needed a full room and consume rot of electricity.

Main first generation computers are:

ENIAC: Electronic Numerical Integrator and Computer, built by J. Presper Eckert and John V. Mauchly was a general-purpose computer. It had been very heavy, large, and contained 18,000 vacuum tubes.

EDVAC: Electronic Discrete Variable Automatic Computer was designed by von Neumann. It could store data also as instruction and thus the speed was enhanced.

UNIVAC: Universal Automatic Computer was developed in 1952 by Eckert and Mauchly.

Main characteristics of first generation computers are:

- Main electronic component -Vacuum tube.
- Programming language - Machine language.
- Main memory - Magnetic tapes and magnetic drums.

•Input/output devices - Paper tape and punched cards.
•Speed and size - Very slow and very large in size (often taking up entire room).
Examples of the first generation - IBM 650, IBM 701, ENIAC, UNIVAC1, etc.

Second Generation Computers: Transistors (1956-1963)

Second-generation computers used the technology of transistors rather than bulky vacuum tubes. Another feature was the core storage. A transistor may be a device composed of semiconductor material that amplifies a sign or opens or closes a circuit. Transistors were invented in Bell Labs. The use of transistors made it possible to perform powerfully and with due speed. It reduced the dimensions and price and thankfully the warmth too, which was generated by vacuum tubes. Central Processing Unit (CPU), memory, programming language and input, and output units also came into the force within the second generation.

Programming language was shifted from high level to programming language and made programming comparatively a simple task for programmers.

Languages used for programming during this era were FORTRAN (1956), ALGOL (1958), and COBOL (1959).

Main characteristics of second generation computers are:-

•Main electronic component - Transistor.
•Programming language - Machine language and assembly language.
• Memory - Magnetic core and magnetic tape/disk.
• Input/output devices - Magnetic tape and punched cards.

• Power and size - Smaller in size, low power consumption, and generated less heat (in comparison with the first generation computers).
Examples of second generation - PDP-8, IBM1400 series, IBM 7090 and 7094, UNIVAC 1107, CDC 3600 et

Third Generation Computers: Integrated Circuits. (1964-1971)
During the third generation, technology envisaged a shift from huge transistors to integrated circuits, also referred to as IC. Here a variety of transistors were placed on silicon chips, called semiconductors. The most feature of this era's computer was the speed and reliability. IC was made from silicon and also called silicon chips. A single IC, has many transistors, registers, and capacitors built on one thin slice of silicon. The value size was reduced and memory space and dealing efficiency were increased during this generation. Programming was now wiped out Higher level languages like BASIC (Beginners All-purpose Symbolic Instruction Code). Minicomputers find their shape during this era.

Main characteristics of third generation computers are:

•Main electronic component - Integrated circuits (ICs)
•Programming language - High-level language
•Memory -Large magnetic core, magnetic tape/disk
•Input / output devices - Magnetic tape, monitor, keyboard, printer, etc.
Examples of third generation - IBM 360, IBM 370, PDP-11, NCR 395, B6500, UNIVAC 1108, etc.

Fourth Generation Computers: Micro-processors (1971-Present)

In 1971 First microprocessors were used, the large scale of integration LSI circuits built on one chip called microprocessors. The most advantage of this technology is that one microprocessor can contain all the circuits required to perform arithmetic, logic, and control functions on one chip. The computers using microchips were called microcomputers. This generation provided the even smaller size of computers, with larger capacities. That's not enough, then Very Large Scale Integrated (VLSI) circuits replaced LSI circuits. The Intel 4004chip, developed in 1971, located all the components of the pc from the central processing unit and memory to input/ output controls on one chip and allowed the dimensions to reduce drastically. Technologies like multiprocessing, multiprogramming, time-sharing, operating speed, and virtual memory made it a more user-friendly and customary device. The concept of private computers and computer networks came into being within the fourth generation.

Fifth Generation Computers

The technology behind the fifth generation of computers is AI. It allows computers to behave like humans. It is often seen in programs like voice recognition, area of medicines, and entertainment. Within the field of games playing also it's shown remarkable performance where computers are capable of beating human competitors. The speed is highest, size is that the smallest and area of use has remarkably increased within the fifth generation computers. Though not a hundred percent AI has been achieved to date but keeping in sight the present developments, it is often said that this dream also will become a reality very soon.

In order to summarize the features of varied generations of computers, it is often said that a big improvement has been seen as far because the speed and accuracy of functioning care, but if we mention the dimensions, it's being small over the years. The value is additionally diminishing and reliability is in fact increasing.

Main characteristics of fifth generation computers are:
Main electronic component - Based on artificial intelligence, uses the Ultra Large-Scale Integration (ULSI) technology and parallel processing method (ULSI has millions of transistors on a single microchip and Parallel processing method use two or more microprocessors to run tasks simultaneously).
Language - Understand natural language (human language).
Size - Portable and small in size.
Input / output device - Trackpad (or touchpad), touchscreen, pen, speech input (recognize voice/speech), light scanner, printer, keyboard, monitor, mouse, etc.
Example of fifth generation -
Desktops, laptops, tablets, smartphones, etc.

Thank you

Sources :
https://www.guru99.com
www.tutorialspoint.com/